

Remarks

Reconsideration and allowance of this application, as amended, are respectfully requested.

Claims 1, 4 and 7 have been editorially amended. Claims 1, 4 and 7 remain pending in the application. The rejections are respectfully submitted to be obviated in view of the amendments and remarks presented herein. No new matter has been introduced through the foregoing amendments.

In addition to being editorially amended for purposes of consistency, claims 1 and 7 have been editorially amended to change "one of light and radiation" to simply "radiation" (since visible light is a type of radiation).

Entry of each of the amendments is respectfully requested.

35 U.S.C. § 103(a) - Applicants' "admitted prior art" in view of Izumi

Claims 1, 4, and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' "admitted prior art" in view of U.S. Patent No. 6,344,370 to Izumi et al. (hereinafter "Izumi"). The Office Action acknowledges that "Applicant's admitted prior art does not explicitly teach that each high-speed switching elements are formed of polycrystalline silicon thin film transistors and converting layer being formed of a polycrystalline film of CdTe or CdZnTe."

The Office Action relies upon Izumi for its teaching of "a method of fabricating a two-dimensional image detector used for X-rays comprising TFTs 4 used as switching elements (col.8 line 10, figures 1 and 2) of the active matrix substrate 1 being formed of polycrystalline-Silicon (col. 9 lines 12-17) and the semiconductor layer 19 that is a photoconductive layer being formed of a vapor-

deposited (MOCVD) polycrystalline film made of CdTe or CdZnTe (col. 9 lines 35-45, col. 10 lines 61-65, figure 2) in order to provide enhanced sensitivity to X-rays." The Office Action concludes that "it would have been obvious . . . to have been motivated to have used poly-silicon as the material for TFTs and polycrystalline film made of CdTe or CdZnTe for the converting layer in order to provide enhanced sensitivity to X-rays as compared with a-Se."

The rejection of claims 1, 4, and 7 under § 103(a) is respectfully traversed. First, the claimed invention would not have been obvious because there is no suggestion or motivation in either Applicants' "admitted prior art" or Izumi that would have led one to select the references and combine them in a way that would produce the invention defined by any of claims 1, 4, and 7. Secondly, even if the references were combined as asserted in the Office Action, they would not result in Applicants' claimed invention.

Applicants' claimed invention includes in pertinent part "a converting layer, formed on said pixel electrodes, to generate a pair of electron-holes by absorbing radiation, said converting layer being formed of a vapor-deposited polycrystalline film of CdTe or CdZnTe."

Applicants' claimed radiation detector would not have been obvious because the disclosure of Izumi does not rectify the above-described deficiency of the "admitted prior art." Izumi fails to suggest a converting layer that is both i) a vapor-deposited polycrystalline film of CdTe or CdZnTe and ii) located on the pixel electrodes, as claimed.

The examiner relies upon the disclosure of Izumi at column 9, lines 35-45. At column 9, lines 18-45, Izumi discloses the following:

The counter substrate 2, on the other hand, includes a supporting substrate (substrate) 16 made of a material having transmissivity for X-rays, for instance, glass, or ceramics. Herein used is a substrate of glass, which has superior transmissivity for both X-rays and visible light, with a thickness of 0.7 mm to 1.1 mm. This type of glass substrate transmits almost all X-rays of 40 keV to 100 keV.

Next, an upper electrode (first electrode layer) 17 made of a metal such as ITO or Au (gold) is provided over the substantial entirety of one surface of the supporting substrate 16. However, when the two-dimensional image detector of the present embodiment is used for detecting images in visible light, it is necessary to use as the upper electrode 17 an ITO electrode, which has transmissivity for visible light.

Next, a p-type semiconductor layer made of, for instance, ZnTe, is provided as a first charge blocking layer 18 over the substantial entirety of the surface of the upper electrode 17. Further, thereon, a semiconductor layer 19 is formed with an i-type semiconductor material having photoconductivity. This semiconductor layer 19 having photoconductivity is provided by depositing a polycrystalline film made of CdTe, CdZnTe, etc. to a thickness of several hundreds of μm by the MOCVD (metal organic chemical vapor deposition) method. Incidentally, instead of the MOCVD method, a polycrystalline film of CdTe, CdZnTe, etc. may be formed by another method such as the close-spaced sublimation method or the paste burning method.

So, in Izumi, the counter substrate 2 (see Izumi Fig. 2) has a semiconductor layer 19 formed over an upper electrode 17. But, Izumi's upper electrode 17 is not a pixel electrode. As disclosed at Izumi column 8, lines 9-12, "[t]he pixel electrodes 3 . . . are

provided on the active matrix substrate 1" (emphasis added) (see the bottom portion of the structure in Izumi's Fig. 2).

Thus, in Izumi, after the semiconductor layer 19 is vapor deposited on the side of a common electrode, the counter substrate 2 is turned over and adhered to the top of the active matrix substrate 1.

Izumi neither discloses nor suggests, however, a converting layer that is a polycrystalline film of CdTe or CdZnTe layer vapor deposited on the pixel electrode on a polysilicon TFT side, which is the subject of Applicants' claimed invention.

In Applicants' invention, the converting layer is vapor deposited on the side of the pixel electrode, and an object of the invention is to prevent lowering of yield by adhesion.

Thus, Izumi does not rectify the above-described deficiency of the "admitted prior art."

Therefore, the claimed invention would not have been obvious because there is no suggestion or motivation in either Applicants' "admitted prior art" or Izumi that would have led one to select the references and combine them in a way that would produce the invention defined by any of claims 1, 4, and 7. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

Furthermore, even if the references were combined as asserted in the Office Action, they would not result in Applicants' claimed invention. The result would be a semiconductor layer formed on a common electrode as in Izumi, not Applicants' claimed radiation detector which includes, *inter alia*, a vapor-deposited polycrystalline film of CdTe or CdZnTe located on the pixel electrodes.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 1, 4, and 7 under § 103(a) are respectfully requested.

35 U.S.C. § 103(a) - Applicants' "admitted prior art" in view of Izumi and further in view of Yamazaki

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' "admitted prior art" in view of Izumi and further in view of U.S. Patent Application Publication No. US 2002/0163035 A1 of Yamazaki.

For all of the reasons identified above in response to the rejection of claims 1, 4, and 7, the rejection of claim 5 is respectfully traversed.

Dependent claim 5, which depends from claim 4 and claim 1, is allowable along with claims 1 and 4, and on its own merits. The disclosure of Yamazaki does not rectify the above-described deficiencies of the "admitted prior art" and Izumi.

For at least the above reasons, reconsideration and withdrawal of the rejection of claim 5 under § 103(a) are respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the examiner is respectfully requested to withdraw the outstanding rejections of the claims and pass this application to issue.

To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including

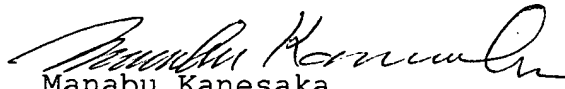
U.S. Application No.: 09/771,547

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extension of time fees, to Deposit Account 11-0219, and please credit any excess fees to such deposit account.

Respectfully submitted,

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